AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A retardation element having an optical axis ~~and~~, the retardation element comprising:

a body consisting of an alkaline-earth metal fluoride crystal having a <110> crystal axis~~,~~;

wherein the optical axis points at least ~~pointing~~ approximately in the direction of the <110> crystal axis of the crystal or a main crystal axis equivalent thereto; and

wherein the retardation element is a lens element with a positive or negative refracting power.

2. (original): The retardation element as claimed in claim 1, wherein the alkaline-earth metal fluoride crystal is one of a calcium fluoride crystal and a barium fluoride crystal.

3. through 7. (cancelled).

8. (original): The retardation element as claimed in claim 1, wherein the retardation element has a diameter in the range from 50 to 300 mm.

9. (original): The retardation element as claimed in claim 1, wherein the retardation element is mounted in an unstressed fashion.

10. (cancelled).

11. (currently amended): The retardation element as claimed in claim 1, wherein retardation element is ~~designed as~~ a meniscus-shaped lens with a negative refracting power.

12. (currently amended): The retardation element as claimed in claim 1, wherein the retardation element ~~has~~ comprises two optical faces~~,~~; and

wherein a shape of the two optical faces is such that, when the retardation element is installed in ~~and~~ an installation position ~~of the retardation element~~ in an optical system, ~~being adapted to one another in such a way that~~ the light path of beams inside the retardation element, ~~is larger~~ between the optical faces, increases with an increase in an ~~the larger the~~ angle ~~is~~ between a penetrating beam and the optical axis of the retardation element.

13. (currently amended): The retardation element as claimed in claim 1, wherein the lens element is ~~retardation element being a lens~~ made from a cubic crystal material with intrinsic birefringence ~~and~~ having a radius and a thickness, wherein as a function of the radius, the thickness has an approximately parabolic profile with radially increasing thickness.

14. (currently amended): A catadioptric projection objective,~~ having~~ comprising at least one retardation element as claimed in claim 1.

15. (currently amended): A catadioptric projection objective for imaging a pattern arranged in an object plane of the projection objective ~~into~~ onto the image plane of the projection objective, the projection objective comprising, arranged between the object plane and the image plane~~, comprising~~:

a catadioptric objective part ~~having~~ comprising a concave mirror and a beam splitter ~~with~~ comprising a beam splitter surface;

a retardation device, having the action of a $\lambda/4$ plate, ~~and being~~ arranged between the beam splitter surface and the concave mirror;

wherein the retardation device comprises ~~having~~ at least one retardation element that is ~~de-signed as~~ a lens ~~and consists~~ of a cubic crystal material having intrinsic birefringence~~,~~; and

wherein the optical axis of the retardation element ~~being~~ is aligned approximately in the direction of a <110> crystal axis of the cubic crystal.

16. (currently amended): A projection objective as claimed in claim 15, wherein the ~~retardation element is made of~~cubic crystal material is one of a calcium fluoride crystal and a barium fluoride crystal.

17. (currently amended): A projection objective as claimed in claim 15, wherein the retardation device comprises at least one retardation element that is ~~designed as~~ a meniscus-shaped lens with negative refracting power.

18. (currently amended): The projection objective as claimed in claim 15, wherein the retardation device comprises at least one retardation element ~~has~~ comprising two optical faces~~,~~; and ~~the~~ wherein a shape of the two optical faces is such that when the retardation element is installed in an ~~and the~~ installation position in an optical system, ~~of the retardation element being adapted to one another in such a way that~~ the light path of beams inside the retardation element, ~~is larger~~ between the optical faces, increases with an increase in an ~~the larger the~~ angle ~~is~~ between a penetrating beam and the optical axis of the retardation element.

19. (currently amended): The projection objective as claimed in claim 15, wherein the ~~retardation element~~lens has a radius and a total thickness; and wherein, as a function of the radius, the total thickness of the ~~retardation element~~lens has an approximately parabolic profile with radially increasing total thickness.

20. (original): The projection objective as claimed in claim 15, wherein the retardation device is arranged in the vicinity of a pupil plane of the projection objective.

21. (currently amended): The projection objective as claimed in claim 15, wherein the retardation device is arranged in the vicinity of the concave mirror.

22. (currently amended): The projection objective as claimed in claim 15, wherein there is no plane-parallel $\lambda/4$ plate ~~is arranged~~ between the beam splitter and the concave mirror.

23. (currently amended): A microlithography projection exposure machine, comprising:

an illumination system; and

a projection objective for imaging a pattern~~-bearing~~ of a mask onto a photosensitive substrate~~,~~;

~~wherein the microlithography projection exposure machine has at least one retardation element as claimed in claim 1~~wherein the projection objective is a catadioptric projection objective according to claim 15.

24. (currently amended): The microlithography projection exposure machine as claimed in claim 23, wherein the illumination system has a retardation element~~ as claimed in claim 1~~.

25. (cancelled).

26. (withdrawn): Retardation plate comprising:

a birefringent crystal plate, the crystal plate having an entry face for incident light and an

exit face for emerging light and an optical axis; wherein

the crystal plate consists of an alkaline-earth metal fluoride and has a <110> crystal axis ;

the optical axis of the retardation plate is aligned at least approximately in the direction of the <110> crystal axis or of a substantially equivalent principal crystal axis; and

a form-birefringent layer structure is applied to at least one of the entry face and the exit face.

27. (withdrawn): The retardation plate according to claim 26, wherein the form-birefringent layer structure is configured as a periodic sequence of at least two dielectric layers with alternating refractive indices.

28. (withdrawn): The retardation plate according to claim 27, wherein a thickness (d) of the layers is less than the wavelength for which the retardation plate is designed.

29. (withdrawn): The retardation plate according to claim 28, wherein the thicknesses (d) of the layers are less than 1/5 of the wavelength for which the retardation plate is designed.

30. (withdrawn): The retardation plate according claim 27 , wherein all the layers have the same thickness (d).

31. (withdrawn): A retardation plate comprising:

a birefringent crystal plate, the crystal plate having an entry face for incident light and an exit face for emerging light and an optical axis perpendicular to the entry face and the exit face; wherein

the crystal plate consists of one of calcium fluoride (CaF_2) and barium fluoride (BaF_2) fluoride and has a <110> crystal axis ;

the optical axis of the retardation plate is aligned at least approximately in the direction of the <110> crystal axis or of a substantially equivalent principal crystal axis; and

a form-birefringent layer structure is applied to at least one of the entry face and the exit face.

32. (withdrawn): A retardation element having an optical axis and consisting of one of a calcium fluoride crystal and a barium fluoride crystal having a <110> crystal axis, the optical axis pointing approximately in the direction of the <110> crystal axis of the crystal or a main crystal axis equivalent thereto, wherein:

the retardation element is a retardation plate having an entry face for incident light and an exit face for exiting light and an optical axis substantially perpendicular to the entry and exit faces; and

the retardation element is one of a $\lambda/2$ retardation plate and a $\lambda/4$ retardation plate.

33. (new): A projection objective comprising at least one retardation element as claimed in claim 1.

34. (new): A method of fabricating at least one of semiconductor devices and other types of microdevices, the method comprising:

providing a mask having a prescribed pattern;

illuminating the mask with ultraviolet light having a prescribed wavelength; and

projecting an image of the prescribed pattern onto a photosensitive substrate, using a catadioptric projection objective according to claim 15, wherein the photosensitive substrate is arranged in a vicinity of the image plane of the catadioptric projection objective.

35. (new): A catadioptric projection objective for imaging a pattern arranged in an object plane of the projection objective onto an image plane of the projection objective, the catadioptric projection objective comprising, arranged between the object plane and the image plane:

a catadioptric objective part comprising a concave mirror and a beam splitter comprising a beam splitter surface;

at least one lens of a cubic crystal material having intrinsic birefringence, the lens having an optical axis aligned at least approximately in the direction of a <110> crystal axis of a crystal;

wherein the lens is arranged between the beam splitter surface and the concave mirror.

36. (new): A projection objective as claimed in claim 35, wherein the cubic crystal material is one of a calcium fluoride crystal and a barium fluoride crystal.

37. (new): A projection objective as claimed in claim 35, wherein the lens is a meniscus-shaped lens with a negative refracting power.

38. (new): The projection objective as claimed in claim 35, wherein the lens comprises two optical faces, wherein a shape of the two optical faces is such that when the lens is installed in an installation position in an optical system, the light path of beams inside the lens, between the optical faces, increases with an increase in an angle between a penetrating beam and the optical axis of the lens.

39. (new): The projection objective as claimed in claim 35, wherein the lens has a radius and a total thickness; wherein as a function of the radius, the total thickness of the lens has a approximately parabolic profile with radially increasing total thickness.

40. (new): The projection objective as claimed in claim 35, wherein the lens is arranged in the vicinity of a pupil plane of the projection objective.

41. (new): The projection objective as claimed in claim 35, wherein the lens is arranged in the vicinity of the concave mirror.

42. (new): The projection objective as claimed in claim 35, wherein there is no $\lambda/4$ plate between the beam splitter and the concave mirror.

43. (new): A microlithography projection exposure machine, comprising:

an illumination system; and

the catadioptric projection objective as claimed in claim 35.

44. (new): A method of fabricating at least one of semiconductor devices and other types of microdevices, the method comprising:

providing a mask having a prescribed pattern;

illuminating the mask with ultraviolet light having a prescribed wavelength; and

projecting an image of the prescribed pattern onto a photosensitive substrate, using a catadioptric projection objective according to claim 35, wherein the photosensitive substrate is arranged in the vicinity of the image plane of the catadioptric projection objective.